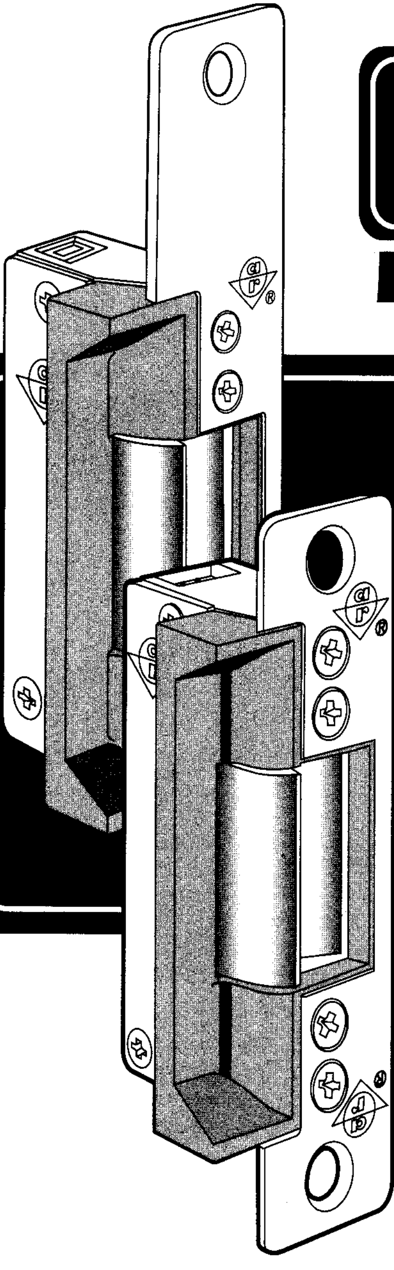
# ELECTRIC STRIKE HANDBOOK



## A Pocket Guide:

**Understanding, Selecting and Troubleshooting Electric Strikes**

*Prepared by:*

ADAMS RITE
MANUFACTURING CO.

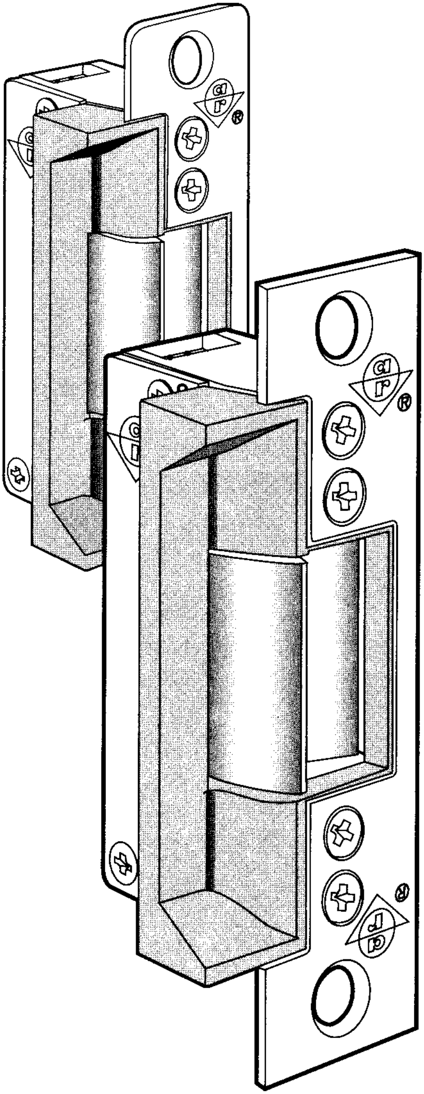
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## INTRODUCTION

This handbook was designed as both an educational guide and as a quick reference tool. It offers a broad understanding of electric strikes and provides answers to common questions associated with their installation and usage.

Electric strikes are not overly complicated devices, but there are many factors to consider when purchasing and installing them. Attention to the Strike Selection portion of this handbook is, of course, the best way to avoid problems listed in the Trouble-shooting section.



# STRIKE SELECTION

Electric strikes are architectural hardware devices that provide remote activation and add security features to a traffic control device. They are highly "pick" and "shake" resistant and can have a long, maintenance-free life when properly installed and powered.

The fact that electric power is used for its operation does not make it an electrical appliance. With a few exceptions, the electrical circuit is designed to meet the needs of the strike, not the other way around. The hardware specifier should select the strike and expect the electrician to provide the power at the point of installation. In cases where an existing circuit is to be used, a strike must be selected to match it.

# HARDWARE CONSIDERATIONS

There are nine considerations to be covered:

**Face Shape:** All Adams Rite electric strikes have flat faces, except for the 7101 and 7131, which have radiused faces to match the nose shape of paired narrow stile glass doors.

**Face Size:** The basic Adams Rite size conforms to American National Standards Institute (ANSI) strike preparation: 1-1/4" x 4-7/8". However, other sizes are offered to fill or cover existing jamb (or opposing stile) preparation from a previous installation.

**Face Corners:** Strikes are available with ROUND corners for installation in aluminum (where preparation is usually done by router) and with SQUARE corners for punched hollow metal ANSI preparation or wood mortise.

**Jamb Material:** Adams Rite has strike models suitable for aluminum, steel or wood jambs. They are designed to fit jamb sections as shallow as 1-3/16". (See Application Chart on page 15).

**Previous Strike Preparation:** If jamb was previously fitted with a 7810 strike, the new 7110 unit will fit with no alteration. In the case where a hollow jamb was originally prepared to receive the bolt from an Adams Rite MS® deadlock and a 4510 or 4710 latch is to be substituted, the 7130 (flat jamb) or 7131 (radius inactive door) will cover the old strike cutout slot.

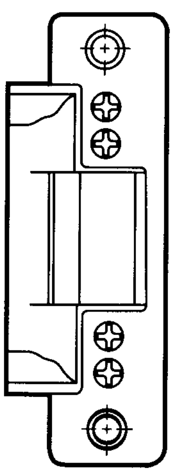
# STRIKE SELECTION

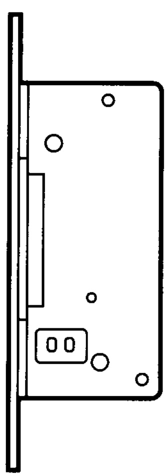
**Lip Length:** The standard lip on all basic Adams Rite electric strikes accommodates a 1-3/4" thick door which closes flush with the jamb. Where door/jamb relationship is different, a lip extension can be added.

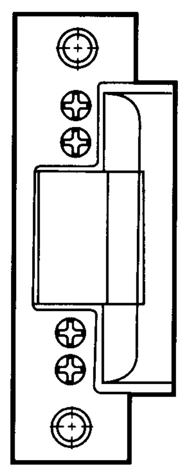
**Compatible Latch:** Adams Rite has strike models that are compatible with other manufacturers' key-in-knob (bored locks) or mortise latches and with our own 4500 or 4700 Series deadlatches, and mortise or rim type exit devices. (See Application Chart on page 15).

**Finish:** Standard anodized finishes for most models are: Satin Aluminum (628), Dark Bronze (313) and Black (335). See Ordering Matrix on page 15 for other finishes available on some models.

**Handing:** All standard operation strikes are unhanded. They can be installed for either right or left hand doors.







# HARDWARE CONSIDERATIONS

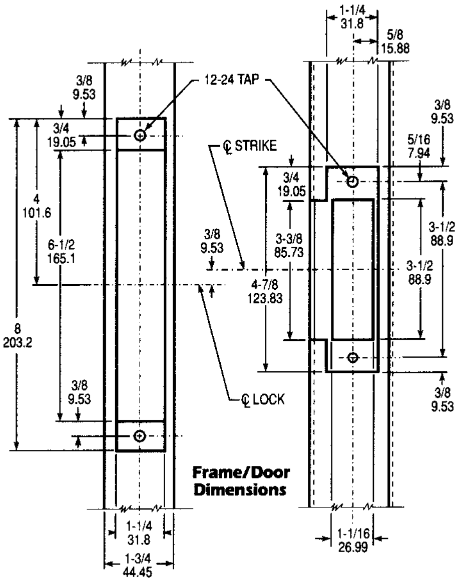
## Installing in different materials

If an electric strike is installed in a wood or aluminum jamb, the required shape of the jamb cut-out is usually not much of a concern. The reasons for this are that wood is easy to work and/or rework and aluminum is routed onsite. In addition, the door frames are usually mortised for the strike by the installing carpenter after the frame installation is completed.

When installing an electric strike into a steel (hollow metal) frame, it is important to keep in mind the ANSI standard that was developed to determine size, shape and location for cutouts that must be made on the door and frame. The standard was developed because steel frames are pre-punched during manufacturing to accept various hardware items.

The shape of the strike cut-out is defined by ANSI for flat metal strike plates used with every lockset. This cut-out is 4-7/8" x 1-1/4" x 3/32" deep, with a 3-3/8" x 3/32" thick strike lip. This shape is the same for both mortise locks and cylindrical (key-in-knob) locks.

**Preparation**
***Per ANSI 115.1***

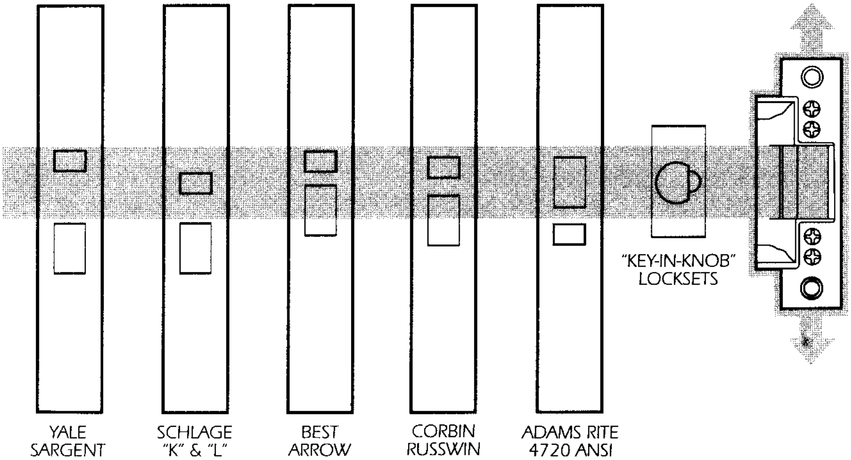



## Installing for different lock types

The requirements for installing an electric strike are most often not determined until after the door and frame are installed, due to the fact that final foot traffic patterns are not finalized until the building is complete. The result is that the electric strikes have to be hand cut into the door frame.

If the door is using a cylindrical-type lock, installing the electric strike is relatively easy. ANSI 161.1 requires that the centerline of the lock's latchbolt and the centerline of the strike be the same distance above the floor. Since most electric strikes are built with the bolt retainer jaw in the center of the faceplate, the door frame face will require only minor modification to permit the installation of an electric strike.

If the door uses a mortise lock, ANSI 115.1 requires that the centerline of the lock's cut-out in the door be 3/8" below the centerline of the strike's location in the frame. Further complicating the situation is the fact that each mortise lock manufacturer positions the latchbolt at a unique location on the lock edge. The reason for the complication in ANSI 115 stems from the fact that mortise locks pre-date the development of ANSI standards. While Adams Rite electric strikes are compatible with latches from virtually all top manufacturers (provided that the strike can be located on center of latchbolt), for retrofit applications, the 7900 Series (or similar offset strike) may be the only answer.




This diagram shows how different lock manufacturers position the latchbolt at unique locations on the lock's edge. With proper location, Adams Rite electric strikes are compatible with latches from virtually all top manufacturers.

# ELECTRICAL CONSIDERATIONS

The first electrical factor to determine is DUTY. Is the operation to be intermittent or continuous? If the door is normally locked and released only momentarily from time to time, then it is intermittent duty. If it is the relatively rare case where the strike is activated (unlocked) for long periods, the duty is continuous. A still rarer requirement is continuous ("fail-safe") in which the strike is locked only when its current is switched on. Adams Rite 7100 Series Strikes are field convertible from one mode to another. However, an AC intermittent solenoid must not be used continuously in either.

**Intermittent Duty:**

For a normal intermittent application, specify an electric strike using 24V AC. This gives enough power for almost any entrance, yet this low voltage range is below that requiring U.L. or Building Code supervision. Good, reliable transformers (4605/4606) are available in this voltage.

The buzzing sound inherent in AC activated strikes is usually not considered offensive in intermittent use. In fact, it acts as an audible signal to a person waiting to enter. If a silent operation is desired, specify 24 VDC and add a 4603 Rectifier to the AC circuit. The rectifier changes 24 VAC to 24 VDC. DC current is silent while operating the strike.

**Continuous Duty:**

Continuous duty is required when the strike will be energized for more than about 60 seconds at a time. Most continuous duty applications can be supplied through the same type 115/24 VAC transformer used for intermittent jobs. Specify "AC Continuous" and Adams Rite will automatically add the rectifier necessary to achieve continuous performance on the 24 VAC voltage specified.

**Fail-Secure vs. Fail-Safe**

Fail-Secure strikes are by far the most popular configuration. A fail-secure strike, with no power applied, is locked or secure. Power is then applied to release the blocking mechanism so that the door can be pulled open. Fail-Safe is the opposite. With no power applied, the strike is safe or unlocked. Fail-Safe strikes are generally energized for long periods.

The main question to ask when selecting this feature is what condition the strike needs to be in if power were to fail. A fail-secure strike remains or reverts to a locked condition, while the fail-safe unlocks. For this reason a fail-safe strike, in most cases, would not be used on the main entrance of a business. Security of the building is compromised in the event of a power failure.

Fail-safe strikes are many times ordered incorrectly. The misconception is that a fail-secure strike will trap someone inside a building. The fact is that, from the inside, an operator such as a lever or pushbar retracts the latch to allow for exiting. Only in specialized applications should a fail-safe strike be used. In addition, a fail-safe strike should never be used in a fire-rated application. The design and control of the circuit is affected by which configuration is desired.

**Monitoring:** If a visual or other signal is required to tell the operator the electric strike status, a "monitoring" strike is needed. Two sensor/switches are added: one is activated by the latchbolt's penetration of the strike and the other by the solenoid plunger that blocks the strike's release. The switches can also be used for "mantrap" applications, where power to one strike is controlled by the switch(es) of the other.

**Transformer:** Low voltage for electric strike operation is obtained by the use of a tranformer, which steps down the normal 115 volt AC power to 12 AC, 16 AC or 24 AC volts. The electrical specifier needs to call out three items: (1) Input voltage (usually 115 VAC) ; (2) Output voltage (12, 16 or 24 VAC); (3) Capacity of transformer, called volt-amps (Output voltage X output amps). Skimping on the capacity of the transformer to save a few dollars will generally under-power the door release and is likely to bring complaints of "poor hardware."

**The Wire:** The wire must carry the electrical power from the transformer through the actuating switch (or switches) to the door release. It must be large enough to minimize "frictional" line losses and deliver most of the output from the transformer to the door release. Just as a small diameter garden hose won't provide a full flow of water from the nozzle, particularly if it's a long run, neither will an under-sized wire carry the full current. (See chart and formula for determining wire size on page 14).

**Electrical Trouble-shooting:** When insufficient electrical power is suspected in a "weak" door release, a simple check can be made. Measure the voltage at the door release while the unit is activated. If the voltage is below that specified on the transformer, the problem is in the circuit, probably an under-capacity tranformer if the circuit length is short. A long run may be both a transformer and wire size problem.

# SOME QUESTIONS AND ANSWERS ABOUT ELECTRICAL CONSIDERATIONS

## What is the electrical voltage source?

The majority of electric strikes are used where 115 Volt AC 60 cycle alternating current is the power source. Unless there are specific customer demands to do otherwise, the 115 VAC 60 cycle source should be stepped down to 24 VAC 60 cycle by use of the Adams Rite 4605/4606 Transformer. This is recommended because at 24 volts there is very little safety problem. Also, popular low voltage transformers are available at any electrical supply house. (Caution: Make sure any replacement transformer matches the circuit requirements.)

## Audible or Silent?

Alternating current changes direction 60 times per second. The audible "buzz" in the unit is that brief instant when the solenoid plunger is released from the pole piece in the coil as the current

decreases through zero and then pulled back against the pole piece as the current builds back up to a peak. Thus, continuous duty alternating current systems are not recommended. By contrast, DC current flows in one direction and when the coil is energized the plunger remains seated until the circuit is broken. Silent operation of a DC strike is achieved in an AC circuit by specifying an Adams Rite 4603 Rectifier to be installed between the transformer secondary and the solenoid coil, which then sees only DC current.

## Can more than one strike be on a given circuit?

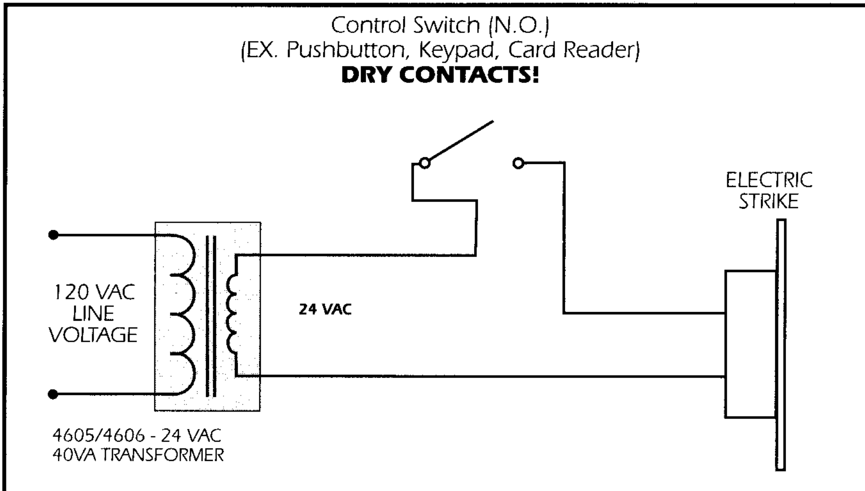
Most circuits involve a single strike powered by a single power source. When multiple strikes (loads) are to be wired in a circuit the strikes must be connected in parallel. Having a dedicated power source for each strike has advantages in that if a power source fails, it affects only one opening. Having one power source supply multiple strikes affects all the openings within the circuit.

## What are Suppression Devices?

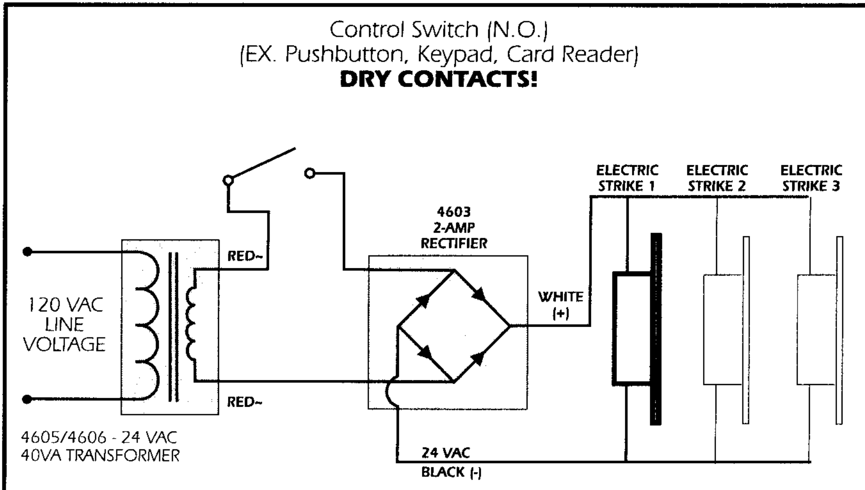
When an inductive load (solenoid) is deenergized, the electromagnetic field collapses, sending voltage back through the circuit. This voltage, over time, can damage control switch or relay contacts. Electrical components can be arranged to limit the effects of this inductive "kickback." Having the rectifier placed between the load and the switch will suppress the kickback. A diode placed in parallel with the switch will protect the contacts in a DC circuit. In AC or DC circuits, use a Metal Oxide Varistor (MOV) to protect the switch contacts in this manner.

## What is "Inrush" current?

Inrush current is the momentary high draw necessary to start the plunger to move from its rest position. Considerably less current is required to "hold" the plunger, in the same way that it requires more energy to start a freight train moving than it does to keep it moving. Consider inrush current when selecting components within a circuit.

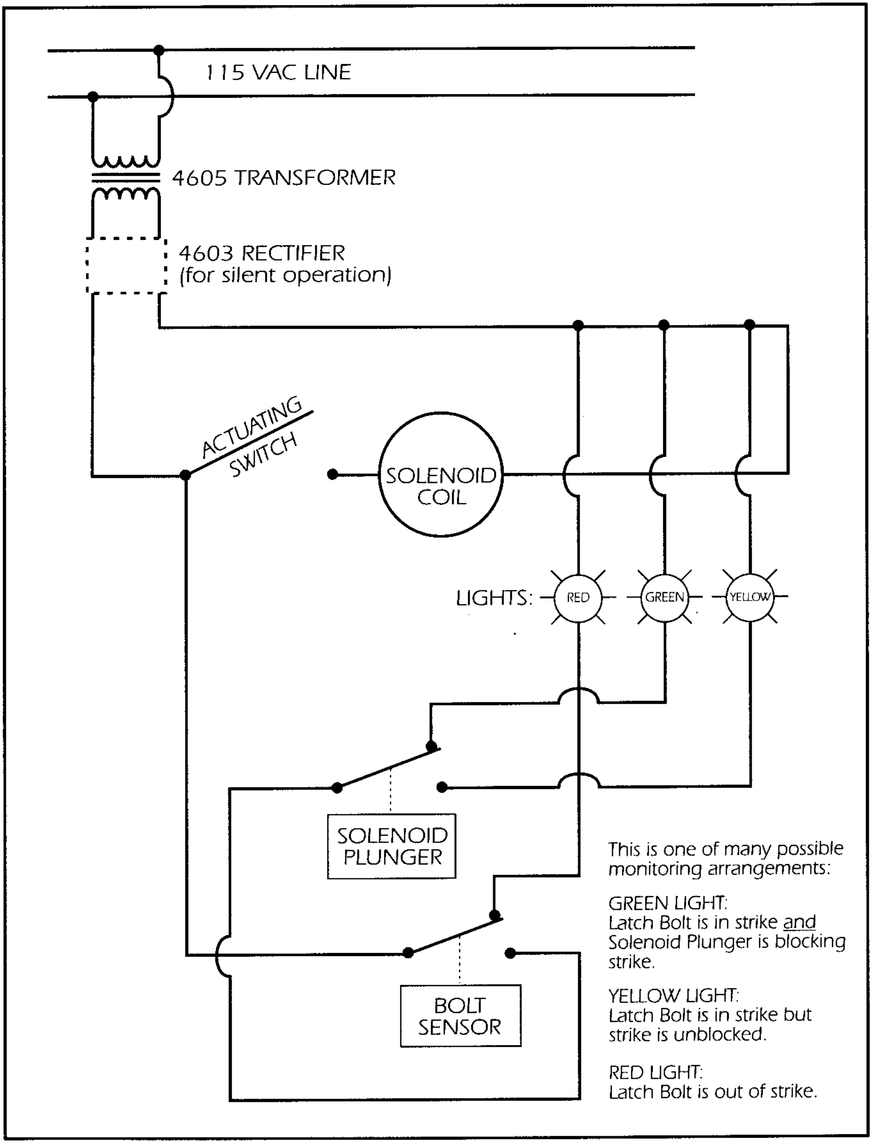



**TYPICAL ELECTRIC STRIKE WIRING DIAGRAM**
**INTERMITTENT DUTY FAIL-SECURE 24VAC**




**TYPICAL ELECTRIC STRIKE WIRING DIAGRAM**
**CONTINUOUS DUTY FAIL-SECURE 24VDC**

STRIKE SELECTION




Sample Wiring Diagram for Monitor Signal Operation

# Wire Selection

In practice, 18-ga stranded should be the minimum size wire used for system wiring. In applications with long runs of wire, or when operating units that have high current requirements, use the chart below as a guide for selecting the proper wire size. Stranded wire, versus solid wire, is recommended for electrified hardware applications. Stranded wire offers greater resistance from the vibration and flexing within door and framing systems. For more information concerning wiring of low-voltage circuits refer to the National Electrical Code (NFPA 70).

| TOTAL LENGTH OF WIRE RUN ONE DIRECTION (FT.) | CURRENT at 24V | | | |
|---|---|---|---|---|
| | .5 Amp | 1 Amp | 1.5 Amp | 2 Amp |
| 0-100 | 18 | 18 | 16 | 14 |
| 100-150 | 18 | 16 | 14 | 12 |
| 150-200 | 18 | 16 | 12 | 12 |
| 200-300 | 18 | 14 | 12 | 10 |
| 300-400 | 18 | 12 | 10 | – |

| TOTAL LENGTH OF WIRE RUN ONE DIRECTION (FT.) | CURRENT at 12V | | | |
|---|---|---|---|---|
| | .5 Amp | 1 Amp | 1.5 Amp | 2 Amp |
| 0-100 | 18 | 14 | 12 | 12 |
| 100-150 | 16 | 12 | 12 | 10 |
| 150-200 | 14 | 12 | 10 | – |
| 200-300 | 12 | 10 | – | – |
| 300-400 | 12 | – | – | – |

**Solenoid Data**

| Description | Lead Color | Coil Resistance (OHMS ± 5%) | Peak Instantaneous Current (AMPS) | Continuous or Hold Current (AMPS) | Peak Instantaneous Power (WATTS) | Continuous or Hold Power (WATTS) |
|---|---|---|---|---|---|---|
| 24 VDC Cont. | White | 141.6 | .170 | .170 | 4.09 | 4.09 |
| 16 VDC Cont. | Green | 61.8 | .222 | .222 | 3.05 | 3.05 |
| 12 VDC Cont. | Red | 34.6 | .332 | .332 | 3.81 | 3.81 |
| 24 VAC Int. | Red | 34.6 | .744 | .431 | 19.15 | 6.43 |
| 16 VAC Int. | Blue | 16.3 | 1.030 | .636 | 17.30 | 6.60 |
| 12 VAC Int. | Yellow | 8.8 | 1.420 | .813 | 17.74 | 5.82 |

# STRIKE SELECTION

## Ordering Matrix

The Adams Rite Numbering System consists of six factors that make up the final Part Number.

**7100 - 3 1 5 - 605 - 00**

**Specify Model** (7100)

**Voltage**
- **3** 12 Volt
- **4** 16 Volt
- **5** 24 Volt

**Current & Duty**
- **1** DC Continuous or Intermittent
- **2** AC Continuous*
- **4** AC Intermittent

**Features****
- **0** Std/Fail-Secure
- **5** Fail-Safe
- **7** Monitor/Fail-Safe
- **9** Monitor/Fail-Secure

**Finish*****
- **628** Satin Aluminum
- **605** Bright Brass
- **612** Satin Bronze
- **613** Oil Bronze
- **313** Dark "Bronze"
- **335** Black
- **625** Bright Chrome
- **626** Satin Chrome

**Lip Extension (Dim."A")**
(Door Centerline to Jamb Edge)

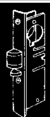
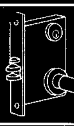
| | | | |
|---|---|---|---|
| **00** | 1.06" or less | **07** | 2.25" |
| **01** | 1.50" | **08** | 2.38" |
| **02** | 1.63" | **09** | 2.50" |
| **03** | 1.75" | **10** | 2.63" |
| **04** | 1.88" | **11** | 2.75" |
| **05** | 2.00" | **12** | 2.88" |
| **06** | 2.13" | **13** | 3.00" |

*A DC strike with rectifier attached for use on AC current.

**Fail-secure can be field-converted to fail-safe or vice-versa.

***Not all finishes available on all models.

## Application

| LATCH TYPE \ MATERIAL | ALUMINUM JAMB | HOLLOW METAL JAMB | WOOD JAMB | ALUMINUM STILE |
|---|---|---|---|---|
|  Adams Rite Deadlatch | 7100<br>7110/11<br>7130 | 7140 | 7110/11<br>7140 | 7101<br>7131 |
|  Adams Rite Mortise Exit Device | 7108 | 7128 | 7128 | |
|  Key-in-Knob or Lever | 7100<br>7110/11 | 7140<br>7240 | 7110/11<br>7140 | |
|  Mortise Lock (without Deadbolt) | 7160 | 7170<br>7270<br>7900 | 7170 | |
|  Rim Panic Device (by Others) | 71R1 | 71R1 | 71R1 | |

The chart above summarizes which strike models are suited for different applications.

# How To Check:

Accurate checking of an electrical circuit requires the proper tool, such as a good 20,000 volt per ohm meter (VOM) or Digital Multimeter (DMM). Of the two types of meters available, the DMM offers greater accuracy and ease of use. The auto-ranging features of a DMM, along with the ability to read both positive and negative voltages, helps even the novice take measurements like a pro. Read the instructions and make some practice runs on simple low voltage circuits.

## How to check Voltage:

(a) Zero the pointer (if analog type meter).

(b) Be sure power is turned off to the circuit being measured.

(c) Set the function switch to the correct voltage to be measured (+DC or AC).

(d) Plug black test lead into the common (–) jack. Plug the red test lead into the (+) jack.

(e) If required, set the range selector to the proper voltage scale. Caution: It is important that the selector be positioned to the nearest scale above the voltage to be measured.

(f) Connect black test lead to the negative side of the circuit and the red lead to the positive side. This is applicable to DC circuit only. Turn power on to the circuit being tested. Turn switch function to DC and turn power back on. Pointer should now move to right for proper reading on the DC scale. AC circuit connections are the same except as noted in (c) above. It should also be noted that polarity in the AC circuit is not a concern.

(g) Be sure to turn the circuit "OFF" before disconnecting multimeter.

**How to check DC Current:**

(a) Zero the pointer (if analog type).

(b) Be sure power is turned off to the circuit being measured.

(c) Connect black test lead to the -10A jack and the red test lead to the +10A jack.

(d) Set range selector to 10 AMPS.

(e) Open the circuit to be measured by disconnecting the wire that goes to one side of the solenoid. Connect the meter in series by hooking the black lead to one of the disconnected wires and the red lead to the other wire.

(f) Turn the power on to the circuit and observe the meter.

(g) Be sure and turn "OFF" before disconnecting multimeter.

**How to find Shorts:**

The multimeter is the most reliable instrument for detecting a short. This is accomplished by setting up the multimeter to measure resistance.

(a) Set the range switch at position R x1.

(b) Set function switch at +DC.

(c) Connect black test lead to the common (–) jack and red test lead to the (+) jack.

(d) Connect the other ends of the test lead across the resistance to be measured. In the case of a solenoid, connect one end of the test lead to one coil terminal, the other end of the test lead to the other terminal.

(e) Watch meter. If there is no movement of the pointer, the resistance being measured is OPEN. If the pointer moves to the peg on the right hand side of the scale, the resistance being measured is CLOSED. If it reads in between these two extremes, it's very likely the solenoid is OK. Compare the measured value to the solenoid data chart on page 14.

# What To Do When:

**Strike will not activate after installation:**

(a) Check fuse or circuit breaker supplying system.

(b) Check to make sure all wiring connections are securely made. When wire nuts are used, care must be taken to be sure both wires are twisted together.

(c) Check the solenoid coil rated voltage (as shown on coil label) to make sure it corresponds to the output side of the transformer within ±10%.

(d) Using a multimeter, check the voltage at the secondary (output) side of the transformer.

(e) Using a multimeter, check the voltage at the solenoid. This will ensure there are no broken wires, bad rectifiers or bad connections.

(f) Check coil for short.

**Strike will not activate after use:**

(a) Check fuse or circuit breaker supplying system.

(b) Make sure you have a transformer. One shot of 115 VAC and the coil is gone.

(c) Make sure the rated voltage of the transformer and the rated voltage of the coil correspond within ±10%.

(d) Check coil for short.

**Transformer overheats:**

(a) Make sure the rated voltage of the transformer and the rated voltage of the coil correspond within ±10%.

(b) Make sure the VA rating is adequate. 40 VA is recommended, with 20 VA being the absolute minimum. Transformer heating may be experienced even in moderate use applications.

**Rectifier overheats:**

(a) The rectifier is wired wrong, which means the overheating is a temporary situation (a few milliseconds) and then it's burned out, or

(b) There are too many solenoids being supplied by a single rectifier and more current is being pulled through it than the diodes are rated for.

**Solenoid overheats:**

(a) The coils used by Adams Rite have coil temperatures that range from 130° to 200°. Regardless of the exact degree, this is something too hot to touch.

(b) Check the solenoid coil rated voltage (as shown on coil label) to make sure it corresponds to the output side of the transformer within ±10%.

(c) The vast majority of Adams Rite intermittent duty units never see the kind of use that brings the coil to maximum rating. If a coil gets extremely hot on very short pulses at two or three second intervals, either the coil is wrong or the transformer output is wrong. The same is true for continuous duty coils. If the coil temperature exceeds the ratings, it is because the coil voltage or the transformer are improperly matched.

(d) If the multimeter is set up to test for a short and the exact resistance is obtained, the results can be compared with specifications found on page 14 to know if the coil is correct.

**Sluggish operation:**

Verify voltage being supplied to the strike. When operation is sluggish or if the strike operates fine in one hand and not the other, it is typically a sign of AC power being supplied to a DC electric strike.

**Strike buzzes:**

(a) When using AC intermittent strikes, this is a normal indication, as AC intermittent strikes are designed to buzz to indicate that the door is open.

(b) If supplying AC power to a DC electric strike, a rectifier must be used to convert the current.

(c) Do not use a half wave rectifier. A full wave bridge rectifier is required to ensure silent operation.

**Door does not latch easily:**

If the door does not latch easily or does not release properly, check for a tight door gap. The strikes are designed to operate with an industry standard 1/8" door gap. Check also for improper fit of door which can cause a pre-load on the strike jaw.

# GLOSSARY
## ELECTRICAL TERMS

**Voltage (Volt):** The electric potential energy that causes current to flow in a conductor. Characterized by the symbol E or V. Analogous to the pressure in the water pipes in a home. (See Chart I).

**Ampere (Amp):** Unit of measurement of the rate of electrical current flow. Characterized by the symbol I or A. Analogous to gallons of water flowing past a given point.

**Direct Current (DC):** This is the term used to describe the flow of electrical current in one direction only, uniform and continuous in the conductor. (See Chart I).

**Alternating Current (AC):** Differs from direct current in only one very important point. It typically starts at zero, gradually increases to a maximum, then gradually decreases to zero. This change is then repeated in the opposite direction. Alternating Current flows back and forth in the conductor as a pendulum swings back and forth. (See Chart I).

**Resistance:** The opposite of current flow in a conductor. It is analogous to friction in a mechanism. The unit of electrical resistance is the OHM and is characterized by the symbol W or R.

**Watt:** A unit of electrical power. Power is work being accomplished. It is characterized most often by the letter P. Power in a DC circuit is the product of the voltage multiplied by the amperage. In an alternating circuit and for resistive loads such as the solenoid in electric strikes, it is the product of the effective voltage multiplied by effective current. The word *effective* means the amount of alternating current that produces the same heating effect that a given amount of direct current produces. For non-resistive loads, such as for a motor, it is the product of the effective current multiplied by the power factor.

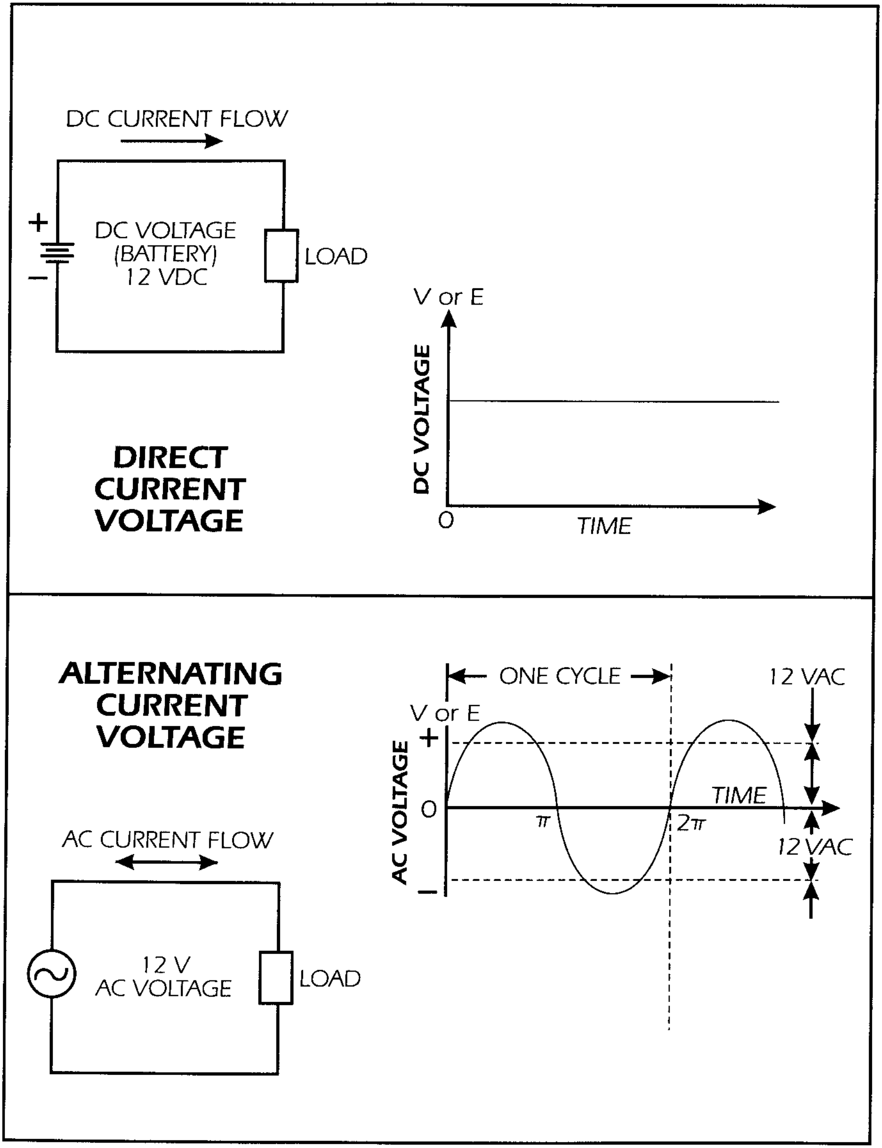



**Chart I**
**AC/DC Voltage**

**Load:** Any object that consumes electrical power, such as a light bulb or electric motor. In some applications the load is a solenoid.

**Cycle:** Also referred to as Frequency – Hertz. The number of times, per second, the current in an alternating current system reverses its direction of flow. 60 cycle is most common to the U.S., however, 25 cycle and 50 cycle are also in use. (See Chart I).

**Duty Cycle:** Refers to the length of time and the frequency any electrical device is started and stopped. Continuous duty simply means the electrical device is energized (started) and left that way for an indefinite period of time. Intermittent means the device is energized for short periods of time and then turned off for minimum periods of time. Example: On two seconds, off ten seconds, etc.

**Volt-Amp (VA Rating):** The product of rated input voltage multiplied by the rated current. This establishes the "apparent energy" available to accomplish work.

**Line Drop (Voltage Drop or Potential Difference):** Any electrical circuit experiences "line drop" resulting from two principal factors: (1) size of the wire – the smaller the wire used, the higher the "frictional" type resistance to the current flow. Thus, if readings were taken at various intervals "downstream" of the power source, a progressive drop in voltage would be observed. This fact can be somewhat offset by proper sizing of wire to the given voltage and length of run; (2) length of run (the distance the electrical device is from its source of power). Obviously, the farther out on the line the device to be electrically operated is, the less power there is available to do the job. See Wire Selection chart on page 14.

# GLOSSARY
## ELECTRICAL TERMS

**Circuit:** The path through which the electrical energy flows to and from the source to the device being operated.

**Conductor:** What the trade commonly calls "electric wiring". A more accurate definition of the word describes the ability of any given material to carry electrical current. Examples of materials that are good conductors and offer little resistance to the flow of electricity are copper, silver, aluminum and carbon graphite, to mention a few. Copper is the most common material used in wiring because it combines low resistance to current flow at reasonable cost. Poor conductors are such materials as green wood, distilled water, moist earth. As a material goes beyond the poor conductor classification, it enters the insulator classification. Insulators have such high resistance to the flow of electricity that none can pass. Typical of those materials are glass, ceramic, mica, rubber and some plastics.

**Transformer:** A transformer is a device for transferring energy in an alternating current system from one circuit to another. Thus, energy at high voltage may be transformed to energy at low voltage and vice-versa. There are many kinds of transformers, but electric strike applications basically require a good quality, step down transformer. A 40 VA rating is recommended. For these applications the high voltage input side of a transformer is called the "Primary" side. The output or low voltage side of the transformer is called the "Secondary."

**Switch:** A switch can be described as a device placed in the electrical circuit in order to "make" or "break" the flow of electrical current.

**Rectifier:** An electrical unit designed to convert alternating current to pulsating direct current. This is accomplished by use of diodes which are the electrical equivalent of a water system check valve, permitting flow in one direction only. (See Chart II). Full-wave rectification is required for proper strike operation.

**OHM's Law:** One of the most widely used principles of electricity. It expresses the ratio of voltage (E), current (I) and resistance (R). The following equations are used in calculating these ratios:

$$E = I \times R \qquad I = \frac{E}{R} \qquad R = \frac{E}{I}$$

**Ground:** Connects the electrical system to the earth. The third (round) prong on an electrical cord is a ground plug. The green wire with spade terminal on an adapter plug (which is supposed to be connected to cover plate mounting screw) is also a ground. The purpose is to minimize danger from shock and prevent lightning from "running-in" and destroying the electrical system.

**Short:** Improper connection between "hot" current carrying wire and neutral or ground.

**Polarity:** Very broadly, it expresses the electrical phenomenon in which like poles (North-North) repel and opposites (North-South) attract. In a DC circuit, it describes the direction electrons are flowing.

**Solenoid & Plunger:** The solenoid itself is a coil of copper windings which are insulated from each other. The magnetic pull strength and current draw are determined by the number of windings. The plunger is a bar (sometimes laminated) of soft iron or steel. This plunger becomes magnetized when the coil is energized and the resulting plunger movement can do mechanical work.

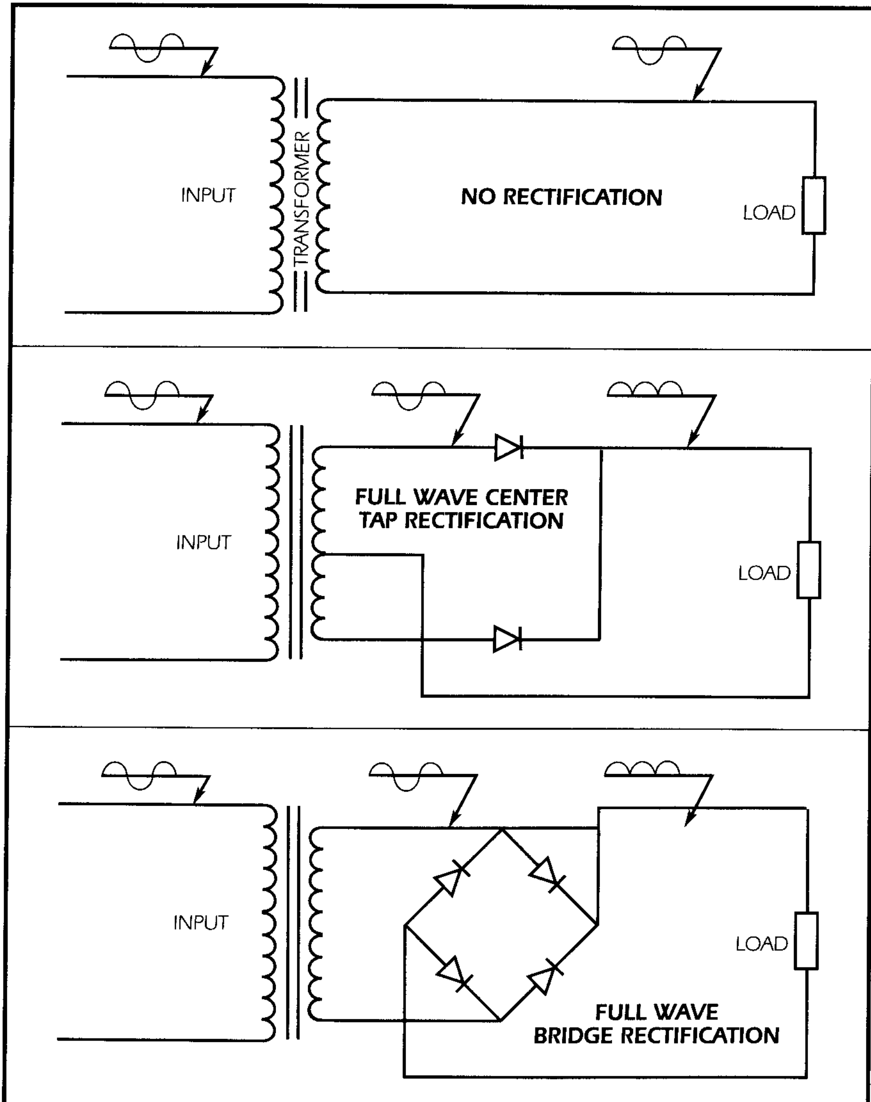



**Chart II**
**Rectifier Circuits**